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Policy for conservation of heritage railway signal boxes in Great Britain

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Abstract

Modern computerised railway control methods are making traditional railway signal boxes obsolete and most signal boxes owned by Network Rail in Great Britain will close by 2026. Many of these signal boxes have a listing as buildings of architectural or historical significance. Listed buildings should ideally remain in their original location and this particularly applies to signal boxes, where the railway environment is an intrinsic aspect of the listing. However, there is pressure to relocate redundant listed and heritage signal boxes. Primary research methodology is by focusing upon key exemplars to determine the actual situation against theoretical conservation policy and practice. Findings are that while relocation affects the building's conservation integrity, presentation of relocated signal boxes in a heritage railway environment provides for interpretation of railway history. The conclusions identify that there are contradictory requirements and pressures in conserving heritage signal boxes. These pressures materially affect the conservation process and there is a need to redefine accepted conservation theory to cope with the realities of signal box preservation. This will necessitate engagement by all interested parties and a systematic identification of all affected signal boxes.

KEYWORDS

Conservation, building relocation, Network Rail, railway heritage, signal box

BACKGROUND

INTRODUCTION

As railways matured away from early wagonways into the form we now recognise, they developed a range of specialist, in many cases innovatory, buildings that became accepted structures in the heritage landscape¹. Signal boxes are one of these specialist buildings, yet are a building type becoming increasingly obsolete as railways worldwide modernise using computer based signalling systems. My paper researches the issues in developing effective policies for conservation of heritage signal boxes in Great Britain by defining the key heritage values of signal boxes, followed by data synthesis through investigating exemplars to determine conservation policy and practice.

Signal boxes² are internationally recognisable structures and archetypes of purely functional buildings possessing heritage values that outlive the functional value of the building. However, the nature of such buildings, especially where machinery is an integral part of the building function, makes reuse difficult. Preservation of other functional building types, such as airfield control towers or military installations, serves to illustrate the issues. There is also a developing sense of what we should preserve, acknowledging that failed past attempts at preserving functional buildings, such as the 'golf balls' at RAF Fylingdales, might have a different outcome today³.

RAILWAY SIGNAL BOXES

The somewhat unexpected success⁴ of early railways led to an increasing need for effective control of train movements, especially at increasingly busy stations and junctions. Integral to this control is 'block signalling', where lineside signals and points prevent more than one train entering a section of track. Providing a shelter for the operator and signalling machinery dates from the 1850's, with initial development of the distinctive and internationally recognisable signal box usually attributed to John Saxby (1821-1913)⁵.

Typically, signal boxes have a simple building layout. An upper operating floor, usually heavily glazed to afford the signal operator a good view of train movements, contains the lever frame, a prefabricated assembly holding levers that operate signals and points. The lower locking room, inside a timber, brick or, occasionally, stone plinth, contains the lower part of the lever frame and the interlocking, an arrangement of the frame that makes it physically impossible for a signal operator to make conflicting settings⁶.

British railway companies generally used a standard signal box design, either developed by the company architect or engineer, or purchased from a manufacturer of signalling equipment⁷. The existence and power exercised by an architects department in a company partly depended upon the company's wealth and the personalities involved⁸. However, even large companies having a strong architects department, such as the Great Western Railway⁹ or the Great Northern Railway¹⁰, might source signal boxes according to specific locational requirements. Thus, signal boxes represent a variety of designs that could be a company design, from a manufacturer or even a local builder. Whichever procurement approach adopted, the standard design was typically modular, expandable according to circumstances, reserving bespoke designs for unusual or prestigious locations.

Despite being a functional shelter, signal boxes are often in a public location, such as on station platforms or adjacent to a level crossing, so the standard of detailing and embellishment usually went beyond the needs of practical function (Figure 1). Such embellishments became less common for later signal boxes, so that by the Second World War, with an emphasis on bomb resistant 'austerity' designs (Figure 2), and into the post 1948 nationalised era of British Railways, signal box design became very austere (Figure 3). Later British Railways designs for large power signal boxes were eclectic, such as the design for Westbury

Signal Box so resembling a central European castle inside security fencing that it acquired the nickname 'Colditz Castle'¹¹.



Figure 1: Heckington Signal Box (1876). This grade II signal box, with adjacent grade I windmill, almost represents an idealised English village environment. In this idealised world, the modern signal post is intrusive.

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Figure 2: Thornhill Signal Box (1943). This signal box is an example of the austere designs for this era. The toilet facilities to the left are a later addition.
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Figure 3: Hubberts Bridge Signal Box (1961). Possibly representing nearly the nadir of signal box design, this signal box is actually the next signal box along the line from Heckington. As an example of the era, arguably it is as worthy of preservation as it's prettier neighbour.

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Privatization of British Railways in 1997 led to the creation of Railtrack, a private company providing railway infrastructure, including signalling, for train operating companies in Great Britain. In 2002 Railtrack became Network Rail, a state owned company limited by guarantee.

Besides the main line railway system, other railway operators in Great Britain make use of signal boxes. These include rapid transit railways, such as London Underground and tram systems, plus commercial private railways serving depots, sidings, railways in ports and military railways. Additionally, the heritage railway movement makes use of redundant main line signal boxes.

SIGNAL BOXES IN DECLINE

Once ubiquitous, this very functional building type serving a specific purpose is now rare. In Great Britain, the decline was under way by the 1930's, with centralised power signal boxes replacing many individual signal boxes at busy locations¹², followed by large numbers of signal boxes becoming redundant through extensive line closures during the 1950's and 1960's. Thus, from a peak of approximately 13,000 signal boxes¹³, by 2010 only 822 remain operational in main line use and owned by Network Rail, of which 530 are 'traditional' signal boxes (Table 1)¹⁴. A further 449 main line signal boxes are out of use, although not all in their original location or Network Rail ownership. In 2012, Network Rail announced that fourteen Regional Operating Centres, where computerised systems control train movements, would be replacing almost all operational main line signal boxes¹⁵. As such, after 2026¹⁶ a majority of signal boxes on Network Rail will be redundant, leaving any remaining signal boxes as outliers kept for a specific purpose, such as supervising the operation of swing bridges.

Table 1: Signal Boxes in Great Britain (2010)

	Active			Inactive			
	Total	Of which:		Total	Of which:		
		Traditional	Listed		Traditional	Moved	Listed
Main line	822	530	53	449	372	193	63
Rapid transit	48	0	0	44	11	0	2
Private	75	5	1	0	-	-	-
Heritage	164	114	2	74	61	0	3

Across Great Britain, in 2010 there were 124 signal boxes listed for protection as buildings of architectural or historical significance¹⁷, the majority owned by Network Rail, with English Heritage (now Heritage England) listing a further 26 signal boxes in 2013¹⁸. Somewhat surprisingly, it is problematic to accurately establish the exact status of listed signal boxes. Individual owners (principally Network Rail and the various heritage railways) view their signal box assets in operational terms without recording listed status or condition¹⁹, while the country specific statutory agencies administering listed buildings will only record listed structures under their jurisdiction. Furthermore, the condition of a number of these listed buildings represent a cause for concern²⁰, although none currently identify as a priority risk²¹. Knowing which buildings are actually at risk also varies according to the data source. Research identifies that the UK 'Buildings at Risk Registers' are fragmented²² and consequentially diminished in efficiency. Minnis notes the demolition of three listed signal boxes²³ and, subsequently, the listed signal box at Dawlish deteriorated to such an extent that delisting followed by demolition became a necessity²⁴.

Empty buildings represent a maintenance liability lacking any commercial advantage²⁵, so it is appropriate to view disposal as an entirely logical way of managing redundant assets. Nevertheless, Network Rail's policy is unequivocally to safeguard the,

*... most significant signal boxes ... for future generations ... that they have a life after the national railway network ... working with heritage organisations to find suitable homes ...*²⁶.

This policy goes beyond the legal obligation to maintain listed buildings and recognises that local communities may often cherish signal boxes that otherwise have no legal protection. Where retained, it is evidently important for these redundant signal boxes to have a suitable and viable use.

While listing has statutory force, preservation of unlisted signal boxes in response to community pressure is potentially problematic. An example is the widely reported situation at Deeping Saint James, near Peterborough, where the community deemed the redundant signal box to be an integral part of their village. Network Rail needed the space occupied by the signal box for operational reasons, so dismantled the signal box and put it into store to allow the community time to identify ideas for reusing the signal box as part of a heritage centre. However, the associated press reporting leaves a sense that all parties were well meaning, yet clumsy²⁷.

HERITAGE VALUES

The typically applied criteria for what to preserve in terms of building conservation are the 'heritage values'²⁸ of:

- Evidential (human activity)
- Historical (notable past events)
- Aesthetics (visual or intellectual impact)
- Communal (meaningful to community)

This is especially the situation for preserving fragile structures, where choices made under pressure of time carry a risk of poor, arbitrary decisions.

Minnis²⁹ comments that until the 1980s there was little interest in studying or preserving signal boxes and, building upon the basic principles of heritage values, proposes specific criteria for listing of signal boxes. Of these, evidential value, considering the specific design or style, appears to be the principal criteria. Furthermore, retention of signal frames and levers seemingly strengthens the case for designation³⁰, as this establishes engineering significance³¹.

Evidential

Preserving an example of each significant signal box design, or preserving specific buildings within a locational setting, seemingly satisfies the evidential value of human activity. For example, although Par Signal Box in Cornwall does not have the original windows, it is a rare early Great Western Railway 'Type 2' design³² and thus fulfils the criteria of preserving an example for a specific design. Subsidiary considerations seem part of the evidential value in listing signal boxes, such as Shrewsbury Severn Bridge Signal Box. Specifically listed as a London and North Western Railway 'Type 4' design, it is equally noteworthy as the largest surviving mechanical signal box in Great Britain³³. However, having country specific statutory agencies does result in some duplication, such as Cadw listing Llanelli West, a Great Western Railway 'Type 2' design, and Rhyl No. 2, a large London and North Western Railway 'Type 4' design³⁴.

In terms of evidential value for railway activities at a specific location, a small number of signal boxes are part of an integral group listing within stations. For example, Stirling Middle and Stirling North Signal Boxes are separate buildings forming part of the Category A listed Stirling Station³⁵.

Historical

Some surviving signal boxes have specific historical significance, such as the signal box at Garsdale (until 1932 known as Hawes Junction) in North Yorkshire. Early on Christmas Eve 1910, the signal operator overlooked a train standing near the signal box and caused a serious fatal collision. The official report³⁶, while noting that contributory factors in the signal operator's negligence were nearly ten hours on duty, atrocious weather and darkness, recommended that installing track circuits to automatically detect a train would be prudent at this and many other locations. Listed in 2013 due to historical significance and a unique frame³⁷, I assert that Garsdale is where the traditional signal box started to become obsolete.

Aesthetics

Although most signal boxes are functional structures to a standard design, there are exceptions. An example is the Brutalism style signal box at Birmingham New Street, designed by the architectural practice of Bicknell and Hamilton in collaboration with the British Railways Regional Architect. Built in 1964 and listed in 1995, contemporary authors described this signal box as ultra-modern³⁸. Successfully embodying form follows function more than many other buildings in the Brutalism style, while it,

*... may polarise public opinion ... the unapologetically bunker-like structure is an honest expression of its utilitarian function.*³⁹

This signal box, however, is due for decommissioning in 2017 and has an uncertain future⁴⁰.

Communal

An example of where communal values form part of the reason for listing is the London, Brighton & South Coast Railway signal box at Eastbourne. As a relatively common Saxby & Farmer 'Type 5', there was a less compelling case for listing other than being the best preserved⁴¹ and, in recognition to the modular nature of standard designs, the largest surviving example of its type. However, community pressure seems to be a factor in this listing⁴², an example of the communal heritage value of preserving a building in an original setting.

RESEARCH

METHODOLOGY

The issue is finding an appropriate future for these redundant buildings, especially as many are potentially fragile timber structures. In setting the parameters for my research, the focus apparently needs to be the potentially conflicting pressure of Network Rail preferring disposal of redundant assets and

a listing process that identifies signal boxes as part of the railway heritage in Great Britain.

My research takes the form of a provisional investigation to scope out the nature of work required to achieve a definitive policy for conservation and future use of redundant heritage signal boxes. Even for standard designs, locations vary and thereby every signal box has a unique aspect, so my research is to focus upon key exemplars to investigate the history and current circumstances for each signal box. While location will make each signal box unique, using exemplars allows identification of conservation practice effectiveness and an indication of transferability of treatment, the objective being to analyse actual situations against a theoretical conservation policy.

One particular aspect needing investigation is the presumption that relocation is necessary to conserve redundant signal boxes. As relocation is contrary to the heritage evidential value of a building's significance within a locational setting, I judge that there needs to be an emphasis on how relocation affects the exemplars.

OPTIONS FOR REUSE

Adaptive reuse of redundant buildings enhances sustainability, although this needs overcoming identifiable barriers including cost and difficulties in maintaining the structural integrity of older buildings. Moving a heritage building as part of adaptive reuse effectively removes one integral component of the building's original historical significance⁴³, especially where recognised heritage buildings are iconic and integral to the cultural identity of a community⁴⁴. McLean observes that,

... listed signal boxes often receive treatment that would be very unusual for other categories of listed structures ... railway preservation bodies ... [consider]

...signal boxes ... as being ... engineering assets and not solely as pieces of built heritage⁴⁵.

Although for historical and social significance a listed signal box should ideally remain in its original location, relocation of disused signal boxes is Network Rail's preferred option⁴⁶. However, if moving a signal box is impossible, due to size, a group listing or other local factors, it then becomes necessary to either reuse the signal box *in situ*, integrating it into the local community, or to mothball the redundant building until it is possible to identify a recognisable use.

Relocation

Relocation frees up land that may have operational value, such as space for new equipment, so following closure of a listed signal box and identifying a new owner, Network Rail will dismantle and relocate the signal box, leaving the new owner to arrange rebuilding. Network Rail identify that relocation to the heritage railway movement, who have experience in preserving railway artefacts, will allow use of the building for which it was designed⁴⁷. This is perhaps idealistic, as although the heritage movement is substantial, it is a segmented movement having wide variations in annual turnover, cost control problems, heavy pressure on volunteer labour and a structure predisposed to wide ranging internal disputes⁴⁸.

Furthermore, the nature of a heritage railway restricts the size and, to an extent, the regional style of signal box that would be useable, leading to concerns that the relocated boxes may be alien to the new locations and thereby lose cultural significance⁴⁹. The heritage movement perception is that, having a limited ability to quickly absorb a large number of rapidly becoming redundant signal boxes, this may be another 'Dai Woodham moment'⁵⁰, in reference to the Welsh scrap merchant who accidentally stored several hundred condemned steam locomotives until the heritage movement found enough money to purchase.

Reuse

Possible alternative uses for redundant signal boxes can include, either on a permanent or temporary basis, residential, retail, community activities (such as space for exhibitions), craft studios, workshops, storage or filming⁵¹.

An example of retail use is the former Platform Signal Box at York, listed Grade II* as part of the station group listing. The former operating floor is at one end of the footbridge and the entire structure occupies a central location opposite the main station entrance, so both levels are within main passenger circulation areas. It is clear that the successful reuse of this former signal box, having a café on the operating floor (Figure 4a)⁵² and a retail outlet occupying the locking room (Figure 4b), is entirely due to a prime location for commercial use.



Figure 4a: York Platform Signal Box, operating floor (1907). With easy access from public circulation area by direct access from the footbridge, the operating floor of this signal box is in prime location for a café.

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Figure 4b: York Platform Signal Box, rear elevation (1907). This rear elevation view illustrates how the locking room has become a retail unit within this circulation area for the station entrance. It is questionable how many of the station users in this illustration are aware that the retail unit and café was originally a signal box.

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Location can be a problem, particularly relating to access, as Network Rail requires physical separation, normally by fencing, of non-operational buildings from the operational railway⁵³. Exceptions, however, do exist, such as a café at Totnes, in Devon, situated in the redundant Great Western Railway 'Type 7' signal box⁵⁴ on a platform and adjacent to an operational railway.

In terms of separation for reuse from an operational railway, the former Midland Railway signal box at St Albans South⁵⁵ is a useful case study. Listed before closure, this signal box suffered deterioration until a preservation trust restored and reopened it as a museum⁵⁶ fenced off from the adjacent operational railway.

Mothballing

Where a signal box remains adjacent to an operational railway, especially where rail locked and therefore inaccessible without crossing a railway, reuse *in situ* starts to become difficult. An example of this situation is Horsham Signal Box (Figure 5), constructed 1938 in the International Modern 'Art Deco' architectural style favoured by the Southern Railway when modernising during the 1930's. Listed in 2002 and closed in 2005, this signal box is now in marginal use as trackside offices⁵⁷ and reported to be in a poor condition⁵⁸. Furthermore, removal for reuse elsewhere is problematic for the larger and more distinctive signal boxes, such as the previously mentioned signal boxes at Shrewsbury Severn Bridge and Birmingham New Street. For these, a creative approach to eventual reuse is a necessity to avoid mothballing.



Figure 5: Horsham Signal Box (1938). The Southern Railway 'Type 13' signal box in International Modern style represents a conscious attempt at an attractive, modern design for interwar era signal boxes.

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Mothballed buildings inevitably deteriorate⁵⁹. They have a lower priority for maintenance funds and any damage, whether accidental or deliberate, remains undetected for longer, thus exacerbating the damage. Fire damage, particularly for predominately timber structures, is an obvious risk leading to some notable

signal box losses⁶⁰. Not surprisingly, a significant number of buildings on the 'Buildings at Risk' register are unoccupied, as a building no longer in use may deteriorate until demolition becomes inevitable⁶¹. Conversely, proactive building maintenance is the best way to protect historic buildings⁶².

THE 'WYLAM QUESTION'

The 'Wylam question' is an unanswerable question defining the situation for many surviving signal boxes. Constructed circa 1897⁶³ by adapting a standard North Eastern Railway design to an over-track configuration, the signal box at Wylam in Northumberland is an unusual, esteemed structure in an attractive location. It is Grade II listed, yet effectively a wooden hut on an iron structure over a busy railway and thereby seemingly pointless other than as signal box (Figure 6). Even mothballing after the projected closure in 2020⁶⁴ carries problems, as the iron structure will be too close to power lines when planned electrification finally happens. Significantly, the listing does not mention an attractive riverside location or, should relocation be a possibility, that the articulate residents of Wylam will most likely have, I would expect following the precedent of Deeping Saint James, a vigorous opinion.



Figure 6: Wylam Signal Box (1897). This signal box is one of only three surviving UK over track designs. Notice the difficult access hindering any alternative reuse for this attractively situated signal box. Wylam, now a commuter village for Newcastle, has a strong connection with early railway history.

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POLICY AND PRACTICE FOR RELOCATION

Network Rail's previously discussed policy of relocation to heritage railways appears to have some support, continuing the idea that listed signal boxes should at least remain in a railway context⁶⁵. It is possible to define heritage railways as linear open-air museums that provide a railway landscape⁶⁶, where interpretation of the railway system as a whole includes showing related objects, such as heritage signal boxes. Within this evaluation, the objective is to achieve a professional approach that matches collection, conservation, presentation and interpretation. Considered in the wider context of building conservation, this idea of seeing how individual elements help interpret the whole is analogous to the idea that it is possible to see the contribution individual heritage buildings make towards a townscape⁶⁷. However, examples of relocating unlisted signal boxes to heritage railways, either for functional use or as a tool for historical interpretation, typically demonstrate a high degree of compromise against the original structure.

Frome North (1875) and Radstock (1909)

These two former Great Western Railway signal boxes are now in use at the Great Western Society railway heritage site at Didcot following relocation in the 1980's⁶⁸. Both are unlisted. One is a Great Western Railway 'Type 2' and the other a 'Type 7' with some non-standard features⁶⁹. However, the relocation process in each case involved relocation of only the upper operating floor, in one case involving demolition of the plinth *in situ* to facilitate removal from site⁷⁰. In the new location, the relocated operating floors for both signal boxes are on replica brick plinths using recovered bricks and supported by modern concrete

foundations⁷¹. In terms of faithful interpretation of the Great Western Railway in a railway context, both signal boxes successfully achieve this objective⁷².

Nevertheless, this emphasis on interpretation is, following demolition of the original plinths to facilitate a continued future for the operating floors, strongly at the expense of exact conservation.

Upper Portland Sidings (1904)

The entirely timber structure Midland Railway 'Type 3a' signal box originally at Upper Portland Sidings represents an even more uncompromising example⁷³. After closure in 1990, this signal box spent many years relocated in storage at a preservation site until again relocated in 2004 for rebuilding at Holt on the North Norfolk Railway (originally part of the Midland and Great Northern Joint Railway, thus reducing the possibility of alien intrusion that could occur through relocation⁷⁴). Unfortunately, during storage the timber structure deteriorated to such an extent that only the operating floor level was recoverable⁷⁵ and the replacement plinth is in modern fair-faced concrete blocks⁷⁶. While an obvious later change conforming to the philosophy concerning honest modifications to heritage buildings⁷⁷, this change makes the building more functional in purpose than historical interpretation.

OPPORTUNISTIC USE

The issue appears to be opportunistic use, which I define as determining the potential for reuse of a signal box as an opportunity for reuse that exactly matches the redundancy of a signal box. As heritage railways continue to develop, there is a mismatch, despite an emerging availability of heritage signal boxes, between demand for signal boxes and availability of suitable signal boxes at the right time. McLean describes a typically anomalous situation where the heritage Keighley & Worth Valley Railway needed a signal box at Keighley, so relocated a signal box from another location while the listed former main line signal box at Keighley is disused and in a poor condition⁷⁸. Furthermore, many heritage railways have concerns regarding the unknown, potentially considerable,

cost of rebuilding a signal box following relocation⁷⁹ and may, if requiring a signal box purely for operational requirements, instead fabricate a new replica signal box.

The use of replica signal boxes sometimes applies even where there is a suitable heritage signal box available on the heritage railway. Kay identifies the Great Western Railway 'Type 28' signal box formerly at Exminster and in storage on the heritage Gloucester Warwickshire Railway as intended for use at the reconstructed Broadway station⁸⁰. However, due to deterioration of the timber signal box during storage, plus a concern about suitability, the railway constructed a replica Great Western Railway 'Type 7' signal box using a frame from the former signal box at Aller Junction⁸¹.

CONCLUSIONS

DISCUSSION

There is an incompatibility between aspirations to conserve many historic signal boxes and seemingly attainable reality. Preserving heritage signal boxes will be difficult and it seems inevitable that many signal boxes are, including those nominally protected by the listing process, potentially at risk of deterioration with some following Dawlish Signal Box to delisting followed by demolition. While all parties concerned appear to be acting in good faith and everybody seems to be aware that there is a problem, it is the peculiar nature and specific location of these buildings that creates difficulties. All the evidence supports the assertion by McLean that listed signal boxes often receive treatment that would be unusual for other categories of listed structures and that heritage railways view signal boxes purely as operational assets.

Nothing in my research indicates any change in this situation and I conclude that the impending redundancy of a large number of Network Rail signal boxes is likely, especially in the short term, to exacerbate the problem. I also conclude

that the 'Dai Woodham moment' is wistful thinking, since steam locomotives are, by definition, mobile, while location is an essential component of signal box preservation. Listing of culturally and historically significant signal boxes is therefore merely a starting point in a process of ensuring these heritage assets have a viable future.

Signal boxes are evidentially unusual buildings with contradictory requirements and pressures regarding effective conservation of those recognised as heritage structures. The requirements identified appear to be relatively direct, in that the conserved signal box needs to be in a railway environment, preferably on the original site for accepted reasons of historical significance, and the conservation includes the interior equipment. Against this, the evidence indicates pressures on the future of individual signal boxes that include:

- Operational need to remove redundant signal boxes from railway land
- The role that a signal box has within a community or contribution to the railway 'townscape'
- Matching heritage railway demand against availability of a suitable signal box for relocation
- Unspecified cost issues for relocation
- Deterioration of relocated signal boxes (particularly timber structures) during storage
- Issue of using relocated signal boxes for interpretation or having fidelity to conservation

Each pressure increases the risk that individual signal boxes suffer neglect while all interested parties seek to resolve the issues. Exacerbating this problem is that there appears to be no systematic identification of those signal boxes most at risk. If hard decisions need making, then it is better to make informed hard decisions, with an urgent requirement to identify those at risk buildings and widening the debate as to effective reuse.

Accepting that proactive building maintenance is the most effective way to protect historic buildings, it is a reasonable expectation that any signal boxes remaining in an original location within a railway environment will become most at risk unless an alternative and viable reuse is possible. St Albans South Signal Box is an effective, even if apparently exceptional, example. It is, however, questionable how many former signal boxes could become museums. The cafés or other alternative uses appear to be more viable, although in cases where the listing includes interior signalling equipment the potential for effective alternative reuse becomes limited. If society, in terms of local communities or wider society including the heritage railway movement, wants effective conservation of heritage signal boxes, the evidence suggests that there is a need to urgently redefine accepted conservation theory to recognise the practical realities of heritage signal box preservation. This needs engagement by all interested parties, including an often fragmented heritage movement that can sometimes seem to be lacking leadership and tending to have competing ideas.

My conclusion is that the heritage railway movement in Great Britain is, as eventual custodian of probably the majority of traditional signal boxes, unlikely to view conservation as a priority. For heritage railways, a signal box is an operational asset plus an element in providing the railway landscape for visitors. The priority is inevitably interpretation rather than conservation and the relatively low numbers of listed signal boxes owned by heritage railways suggests an acceptance of this situation.

As part of defining signal box conservation policy, it is clear that there needs to be a greater clarification as to the extent of the problem, and costs involved in all options. This would seem to require a systematic identification of all, regardless of ownership or country, heritage signal boxes, including those not formally protected by a listing. This will allow a provisional identification of those that may have to remain in location as opposed to those where relocation or an alternative use is readily apparent. Arising out of this identification, there also appears to be

a need, rather than the informal process currently adopted, to effectively match redundant signal boxes against potential heritage railway uses, along with a clear acceptance that this involves interpretation rather than conservation.

FURTHER RESEARCH

While the exemplars offered point towards a conclusion that the problems of conserving heritage signal boxes are systemic for conserving purely functional buildings, there is a clear requirement to confirm this tentative finding. Further work, scoping the extent of the balance between various reuse options or conservation *in situ*, is necessary to inform the debate as to the future for heritage signal boxes. Within the constraint of a short timescale for redundancy of many signal boxes, this work requires a wider sampling by way of a systematic quantitative study of heritage signal boxes, both listed and unlisted, to apply the test of future use. There is also a need to clarify if interpretation is an acceptable conservation approach where the original building's heritage value is evidential rather than architecturally significant.

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Minnis, J., *Railway Signal Boxes: A Review*, English Heritage Research Report Series 28-2012 (2012), p. 2, approximates the number of operational traditional main line signal boxes in Great Britain as 500. Defining traditional is arbitrary and, based upon Kay pp. 5-6, I define traditional as mechanical signal boxes built before circa 1950

¹⁵ Network Rail, *New traffic management system signals better, more efficient railway for Britain*, News release, 29 August 2012

¹⁶ Derived from a list prepared by Milner, C., 'The resignalling of Britain's Railways', *The Railway Magazine*, August 2014, pp. 16-21

¹⁷ In the United Kingdom, buildings of architectural or historical significance are 'listed' by the relevant statutory agencies for each country, being Heritage England (formerly English Heritage), Historic Scotland, Cadw (Wales) and Northern Ireland Environment Agency. Each protected building is

listed according to importance on a three tier system, being Grade I, II* and II (England and Wales), Category A, B and C (Scotland) or Grade A, B+ and B1 (Northern Ireland). Listings at Grade I or A represent buildings of national importance. Most signal boxes in Great Britain, that is England, Scotland and Wales, are Grade II or B, with a few listed in higher categories where part of a group listing that includes all buildings at a location, such as a station.

¹⁸ English Heritage, *England's Railway Signalling Heritage Recognised*, News release, 26 July 2013

¹⁹ Network Rail *Signal Box Location Asset Register*, 15 August 2013

²⁰ Hinson, J. (2015), *Listed Signal Boxes*
<<http://www.signalbox.org/last/listed.htm>> [accessed 17 April 2015]

²¹ For example, no signal boxes explicitly appear in *Heritage at Risk*

Priority Sites 2014, published by Heritage England.

²² Forster, A.M. & Kayan, B., 'Maintenance for historic buildings: a current perspective', *Structural Survey*, Vol 27, No 3, (2009), p. 214

²³ Minnis, p. 51

²⁴ Davies, N., *Demolition of signal box, Dawlish Railway Station*, (Letter to L. Whitaker, 23 May 2013, Teignbridge District Council 13/01290/DEM)

²⁵ Swallow, P., 'Managing unoccupied buildings and sites', *Structural Survey*, Vol 15, 2, (1997), pp. 74-9

²⁶ Network Rail, *England's railway signalling heritage recognised*, News release, 26 July 2013

²⁷ BBC News (2014), *Work starts to dismantle Victorian signal box in Deeping St James*, <<http://www.bbc.co.uk/news/uk-england-lincolnshire-29742367>> 23 October 2014

²⁸ English Heritage, *Conservation Principles: Policies and Guidance* (English Heritage, April 2008), pp. 27-32

²⁹ Minnis, p. 1. Although this report was specifically for English Heritage, the criteria proposed appear to have value internationally.

³⁰ *Signal boxes: Amplified Listing Selection Criteria* (English Heritage, April 2011), p. 3

³¹ McLean, pp. 314, 318-9

³² Minnis, p. 38

³³ Minnis, p. 26

³⁴ For comparison, Shrewsbury Severn Bridge has 180 levers (Kay p. 27) while Rhyl No.2 has 126 levers (Kay p. 76). While Shrewsbury is undoubtedly the largest, both are considerably larger than most signal boxes catalogued by Kay.

- ³⁵ Historic Scotland listing reference LB41131. See also *Signal Boxes*, published by Historic Scotland, p. 8
- ³⁶ Pringle, J.W., *Fatal collision that occurred on the 24th December 1910, between an express passenger train and two light engines near Hawes Junction on the Midland Railway*, Board of Trade (Railway Department), London: H.M.S.O. (1911), pp. 5-8
- ³⁷ Historic England list entry for Garsdale Signal Box, entry number: 1412055 (<http://list.historicengland.org.uk/resultsingle.aspx?uid=1412055>) [accessed 14 September 2015]
- ³⁸ Nock, O.S., *Britain's New Railway* (Ian Allan, London, 1966), p. 154
- ³⁹ Birmingham Post (2013), 'Birmingham's Hidden Spaces: New Street signal box polarises public opinion', *Birmingham Post*, <http://www.birminghampost.co.uk/lifestyle/birminghams-hidden-spaces-new-street-6449349>, 31 December 2013
- ⁴⁰ Milner, pp. 16-21
- ⁴¹ Minnis, p. 10
- ⁴² Austin, P., 'Latest English Heritage Listings', *Observer* (Eastbourne Society, No 195, Summer 2013), p. 4
- ⁴³ Bullen, P.A., 'Adaptive reuse and sustainability of commercial buildings', *Facilities*, Vol 25, No 1/2 (2007), p. 26
- ⁴⁴ Bullen, P.A. & Love, P.E.D. (2011), 'Adaptive reuse of heritage buildings', *Structural Survey*, Vol 29, No 5, 2001, pp. 412-3, 419
- ⁴⁵ McLean, p. 319
- ⁴⁶ Network Rail, *Redundant Signal Box Strategy for Network Rail*, Safety Technical & Engineering Guidance document, BLDG-GN-AC-80-10-77, July 2015, pp. 12-4
- ⁴⁷ Network Rail (2015), p. 12

- ⁴⁸ Carter, I., *British railway enthusiasm*, (Manchester: Manchester University Press, 2008), pp. 114-7, 130-6
- ⁴⁹ McLean, pp. 311-20
- ⁵⁰ Milner, pp. 16-21
- ⁵¹ Kilty, B., *The Future Reuse of Listed Decommissioned Railway Signal Boxes*, Undergraduate thesis, Northumbria University (2015), p. 6
- ⁵² Kay, p. 79
- ⁵³ Network Rail (2015), p. 15
- ⁵⁴ BBC News, *Railway signal boxes granted Grade II listed status*, (<<http://www.bbc.co.uk/news/entertainment-arts-23451290>>, 26 July 2013)
- ⁵⁵ Kay, p. 76
- ⁵⁶ NRHA, *St Albans South signalbox plaque unveiled*, National Railway Heritage Awards, (<http://nrha.org.uk/st-albans-south-signalbox-plaque-unveiled/>), July 2011)
- ⁵⁷ Kay, p. 74
- ⁵⁸ Reeves, M.D., *Horsham*, (email to C.D. Reeves, 17 July 2015)
- ⁵⁹ Swallow, pp. 74-9
- ⁶⁰ BBC News, *Arsonists target saved railway signal box near Bognor*, (<<http://www.bbc.co.uk/news/uk-england-sussex-11846868>>, 26 November 2010) and Brodrick, N., 'Blaze leaves Midland signalbox in ruins', *The Railway Magazine*, May 2015, p. 65
- ⁶¹ Swallow, pp. 74-9
- ⁶² Forster, A.M. & Kayan, B., 'Maintenance for historic buildings: a current perspective', *Structural Survey*, Vol 27, No 3, (2009), pp. 210-29
- ⁶³ Kay, p. 29
- ⁶⁴ Milner, pp. 16-21

- ⁶⁵ McLean, p. 319
- ⁶⁶ Höhmann, R. (2002), 'The Future of Heritage Railways and Rail Conservation in Germany', *Japan Railway & Transport Review*, 30, March 2002, pp. 20-2
- ⁶⁷ Pickard, R.D., *Conservation in the Built Environment*, (Harlow: Addison Wesley Longman Limited, 1996), pp. 58-63, 178
- ⁶⁸ McLean, p. 318
- ⁶⁹ Great Western Society, *Frome Mineral Junction Signal Cabin* (<<http://www.gwsbristol.org/hfrome.html>>, 1 November 2009) and Great Western Society, *Radstock North Signal Box*, (<<http://www.gwsbristol.org/hradstock.html>>, 29 December 2013)
- ⁷⁰ Price, A., 'The Frome North Project', *Great Western Echo*, No 89, Spring 1985, pp. 4-6
- ⁷¹ Great Western Society (2009) and Great Western Society (2013)
- ⁷² When seen in terms of the criteria set by McLean, pp. 317-9 and Höhmann, pp. 20-2
- ⁷³ Kay, p. 62
- ⁷⁴ McLean, pp. 312, 314-5
- ⁷⁵ Midland Railway Trust, *Signal boxes* (<<http://www.midlandrailway-butterley.co.uk/signalboxes/nonoperational.html>> [accessed 28 July 2015])
- ⁷⁶ Signalling Study Group, p. 49 comment that a handful of signal boxes constructed before 1923 had experimental concrete block plinths
- ⁷⁷ Pickard, pp. 157-67
- ⁷⁸ McLean, p. 316
- ⁷⁹ Robinson, M., *Signal boxes*, email to C.D. Reeves, 21 July 2015
- ⁸⁰ Kay, pp. 57, 73
- ⁸¹ Brodirick, N., 'New box signals progress at Broadway', *The Railway Magazine*, October 2015,

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